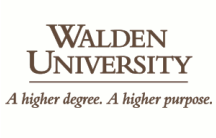

2018

Health Literacy as a Measure to Reduce Cost, Improve Health and Access

Vivian Dee
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral study by

Vivian Dee

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Sue Bell, Committee Chairperson, Nursing Faculty
Dr. Mary Tan, Committee Member, Nursing Faculty
Dr. Andrea Tatkon-Coker, University Reviewer, Nursing Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2018

Abstract

Health Literacy as a Measure to Reduce Cost, Improve Health and Access

by

Vivian Dee

MS, Monmouth University, 2001

BS, St. Paul College of Manila, 1979

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

May 2018

Abstract

The United States dedicates greater than 17% of its gross national product to healthcare. This percentage is expected to go up to 20% by 2018. Despite the high cost of care, the health care system remains inefficient and ineffective. Barriers include reduced access to care related to low health literacy. Complicating low health literacy is the high readability score of patient education materials. The high readability score is in part due to tools that are not standardized and measure different aspects of education materials creating varying readability scores. The purpose of this quality improvement project was to adopt a tool, the Clear Communication Index, which is evidence-based and standardized using the federal Plain Language Guidelines, to assess the reading score of educational materials in a 62-bed acute long-term care facility. The plan, do, study, and act model was used as a translational framework to guide this project, and the theory of goal attainment served as the theoretical support for the project. The Clear Communication Index worksheet was used to assess the readability of documents given to patients at discharge. Any score below 90% was considered difficult to understand and required revision. One month after implementation, patient satisfaction scores on 2 metrics showed improvement. The score for "When I left the hospital, I clearly understood the purpose for taking each of my medications?" increased from 58.2% to 90.7%. The 2nd patient satisfaction survey metric, "During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?," increased from 73.1% to 83.3%. The results may promote social change by providing equal care access to all through readable educational materials.

Health Literacy as a Measure to Reduce Cost, Improve Health and Access

by

Vivian Dee

MS, Monmouth University, 2001

BS, St Paul College of Manila, 1979

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

May 2018

Dedication

I would like to dedicate this project to my family who worked tirelessly with me throughout the process. To my son Mark who painstakingly edited my paper. To my precious son Tim, who was my best cheerleader. To my husband who cooked for me and encouraged me. Most of all of all, I want to thank God for the gift of why.

Acknowledgments

I want to thank the scholars of Walden University who encouraged and provided me the tools to create positive change. I want to extend my gratitude to Dr. Sue Bell who patiently guided me through the process. I also want to thank Dr. Mary G. Tan for her comforting words and her words of wisdom, that made this journey engaging. Lastly, I want to thank my preceptor Bonnie Solitaire for her time.

.

Table of Contents

Section 1: Overview of the Evidence-based Scholarly Project

Introduction

Health care in the United States is increasingly expensive. Nash, Fabius, Skoufalos, and Clarke (2015) explained that the United States dedicates greater than 17% of its gross national product (GNP) to health care. This percentage is expected to increase 3% to 20% by 2018. Nash et al. contended that despite the high expenditures, the United States is low on efficiency, equity, performance, effectiveness, access, and a healthy way of life compared to countries such as Australia, Canada, Germany, New Zealand, and the United Kingdom. Stiefel and Nolan (2012) reported that socioeconomic status drives the major U.S. health disparities, which accounted for almost 40 million uninsured in the country. It is estimated that 112 million people in the United States suffered from at least one chronic condition (Fowler, Leving, & Sepucha, 2011).

Barriers to health care included lack of cultural and linguistic ability, low health literacy (HL), poor health care access, and lack of coordination of care. These factors have resulted in the inability to access medications and preventive care, subsequently leading to poor clinical outcomes and higher costs of care. Indeed, the literature showed that low HL alone is associated with higher medical use as well as higher costs (Betancourt, Corbett, & Bondaryk, 2014)

HL is the capability to gather, comprehend, and act on basic medical facts to make proper health choices. Without a good understanding of self-care and control of diseases,

people are not likely to comply with a prescribed plan of care. The high-risk groups with low HL include adults over the age of 65 and members of racial and ethnic minorities. New settlers and immigrants, anyone with less than a high school diploma, and economically disadvantaged groups are populations at risk for low HL (Bauer, 2010). In a population-based study of 92,749 veterans, the researchers found an association between HL and usage of health services as well as cost. The findings showed average prices for service usage were higher for a patient with low HL ($31,581) than for a patient with adequate HL ($17,033) over a 3-year period. The overall health care costs for patients with low HL was estimated at $143 million dollars more than for patients with adequate HL (Haun et al., 2015).

Language barriers, socioeconomic status, and educational attainment influence HL. Kindig, Panzer, and Neilsen-Bohlman (2004) explained that even people with high literacy skills might have difficulty using information. Examples included a physician having a limited understanding of how to help a patient fill out legal forms, a realtor not understanding a report about a brain scan, and a businessperson not having knowledge about when to get a mammogram. Language, culture, and education are mediators of health literacy. These three concepts (language, culture, and education) are explored in this paper. Because HL is a balanced interaction of a person's education, income, skills, and ability to understand health-related material, the healthcare system, the educational system, and the cultural system (home, social, and work environments), all must share the responsibility to improve HL in the U.S. population.

Culture signifies shared value, thoughts, and significance or meaning learned by a person as a part of his community. A person's attitudes and beliefs are affected by his social, cultural, and family interactions, which in turn shape how he interacts with the health care system. A person understands, learns, and reacts in the context of these cultural processes (Kindig et al., 2004).

To illustrate the impact of culture on health care outcomes, Thomson and Hoffman-Goetz (2007) performed a systematic review that evaluated the readability and cultural sensitivity of online patient education materials (PEMs). The writers concluded that the online PEMs were not culturally sensitive when analyzed using the Cultural Sensitivity Assessment Tool (CSAT) and the Cultural Sensitivity Assessment Checklist (CSAC).

Wu, West, Chen, and Hergert (2006) illustrated the importance of cultural influence in seeking health information. The authors described culture as affecting health information avoidance; the avoidance occurred because of cultural connotations linked to an illness, which may add to the patient's distress. For example, Asian women expressed concerns about the breast being touch by a male practitioner during a breast exam or unnecessary exposure to radiation during mammography. These fears lead to withholding information or avoiding help. Additionally, the researchers reported traditional healing methods are still in existence in some cultures and may dilute the relevance of the Western health care system. Culture should, therefore, be considered when writing PEMs to achieve value and quality outcomes.

Education is a critical determinant of health and is associated with other social determinants such as self-efficacy, income, (Bailey et al., 2014; Baker, Leon, Smith Greenaway, Collins, & Movit, 2011), and work status (Baker et al., 2011). Education inequality impacts HL (Sentell, Zhang, & Ching, 2015). To understand the relationship of HL and education better, it is essential to comprehend the structure of U.S. education. The U.S. free education system consists of Kindergarten through the 12th (K-12) grade. The K-12 education is accountable for teaching the skills in calculating numbers and literacy that serve as a foundation for understanding written and spoken information and prepares students for higher education. The United States provides adult education to seniors and to immigrants who did not complete K-12 education yet want to pursue reading, writing, and speaking English (Kindig et al., 2004).

However, the U.S. educational system does not provide equal access to minority students (Williams & Collins, 2001); therefore, minority students receive inferior educational quality compared to whites (Baker et al., 2011). This disparity can influence health outcomes negatively because a good education (a) provides capacity for understanding, reading skills, and ability to learn; (b) impacts the economic condition of an individual; and (c) can provide personal, social networks that improve health care outcomes (Egerter, Braveman, Sadegh-Nobari, Grossman-Kahn, & Dekker, 2009). Poor education can serve as a barrier to a high level of HL. Conversely, Berkman, Sheridan, Donahue, Halpern, and Crotty (2011) reasoned that a good education could be a strategy to improve HL.

Additional factors complicating HL are the language and readability of PEMs. Friedman, D. B., & Hoffman-Goetz, L. (2006) noted and expressed concerns regarding the accuracy of using a single readability assessment tool. For this reason, most national health care websites use multiple instruments to assess the reading scores for each PEM posted. The different readability tools commonly used to evaluate PEMs include the Flesh-Kincaid readability tool, the Simple Measure of Gobbledygook (SMOG) index, the Peter Mosenthal and Irwin S. Kirsch measure (PMOSE/IKIRSCH), the Coleman-Liu Index, the New Dale-Chall Readability Formula, and the Patient Education Materials Assessment Tool (PEMAT). Each tool is used to measure different aspects of the PEMs. Moreover, the instruments are not used to assess risk or evaluate whether the information provided helps patients to act (McClure, Ng, Vitzthum, & Rudd, 2016).

In a recent study, Prabhu et al. (2017) evaluated online palliative care reading materials and found that the readability score of the 100 articles reviewed ranged from a 12.5- to a 14.5-grade reading level, using the readability algorithms commonly used for assessment of the medical literature. A study of gastrointestinal websites by Azer, AlOlayan, AlGhamdi, and AlSanea (2017) reported a reading level score of 11.9 ± 2.4 grades. Unaka (2017) analyzed pediatric discharge hospital summaries and reported a mean readability score at a 10th-grade level. Gastroesophageal reflux disease mobile applications were found to have a reading level ranging from the 9.6-grade level to the 12.9-grade level (Bobian, 2016).

Recently, Kapoor, George, Evans, Miller, and Liu (2017) assessed 372 PEMs from the American Heart Association and the American College of Cardiology to

determine the readability scores of the PEMS produced by these authoritative agencies. The materials were rated at the 6th-grade level using the Coleman-Liu Index and at the college level using the New Dale-Chall. These tools were used to analyze the same PEMs but yielded different readability scores.

Compounding the low HL of patients is the absence of a standardized HL score associated with PEMs. Badarudeen and Sabharwal (2010) reported that different health care agencies recommended inconsistent cut-off scores of readability requirements for PEMs. For example, the recommended reading score of PEMs by the National Institute of Health is different from the recommended reading score of the Centers for Disease Control and Prevention (CDC). To complicate matters, the checklists and readability formulas used in assessing readability scores measure different characteristics of PEMs, making comparison and standardization impossible.

Problem Statement

This doctoral nursing practice (DNP) project addressed the nonstandardized and variable readability tools used in assessing the readability score of PEMs. The variability was creating ineffective, unusable PEMs that presented at the practicum site with a financial burden and compromised patient safety. For over a decade, a 62-bed acute long-term care hospital in Southern Texas has used traditional readability tools and formulas to assess the reading level score of its PEMs. These tools are not evidence-based or standardized. Using these tools resulted in variation in reading scores of PEMs. Additionally, these tools did not allow for the assessment of cultural competency, visual presentation, risk, and actionability. The unusable and ineffective PEMs cost the

organization an estimated $8,000 per year (Lifecare, personal communication, May 31, 2017). Furthermore, unusable PEMs could have contributed to additional health care costs because of inadvertent medication nonadherence due to misunderstanding of medication instructions, which could have resulted in medical emergencies and rehospitalizations. The waste was contributing to an unnecessary financial burden on the organization and inefficient processes causing poor patient satisfaction and care outcomes (National Research Corporation Memo, personal communication, May 31, 2017).

Purpose Statement

The purpose of this quality improvement (QI) project was to adopt a standardized and evidence-based readability tool using the Clear Communication Index (CCI) to evaluate PEMs. Frieden (2014) explained that the national, regional, and state goals were to improve HL. The author contended that providing meaningful and understandable information was the key to improving access to health care. To this end, researchers in numerous studies (Friedman & Hoffman-Goetz 2006; McClure et al., 2016) have examined different readability formulas and checklists to assess the reading level score of PEMs. The findings have been consistent that standardization between the readability tools and what they measure are lacking. These inconsistencies have led to inaccurate and unusable education materials.

Nature of the Doctoral Project

Methods applied in this project included a literature review of national clinical guidelines, rating of existing evidence using updated national and high-level evidence, development of a nursing education module on the use of the standardized readability

tool for staff, stakeholder meetings to gather project input, and data collection on stakeholder satisfaction with the project management of the practice change initiative. Formative outcomes were in the form of stakeholder meeting minutes and a worksheet reporting the best practices from the literature related to the readability tools. Summative outcomes included results of a survey of stakeholder satisfaction with the DNP project leadership and comparison of patient satisfaction outcomes on the two HL questions. The questions were related to the understanding of and satisfaction with the discharge instruction. The results provided scores against organizational benchmarks for patient satisfaction compared 3 months before the intervention to improve the readability of PEMs and 3 months after the implementation.

The CDC (2005) created the CCI, which is an evidence-based readability tool that measures components of PEMs in a standardized way. For this QI project, the CCI served as an alternative to the traditional tools used in the hospital to measure readability scores of PEMs. I provided the steps for how to evaluate a PEM using the CCI. The project team used the instrument to evaluate the readability of the new patient PEM created for use and given to the patients at discharge.

Significance

The adoption of the CCI tool to measure PEMs is evidence-based and transferable to other general practice areas. The standardization of PEMs provided equal opportunities to benefit from health care educational materials to patients with low HL. This practice change not only provided a significant contribution to nursing practice but also improved

patient access to care and delivery system outcomes. This project provided medical information that is accessible, useful, and easy to understand for the patients served.

Summary

Community health approaches for strong public health include reaching vulnerable populations. One of the public health strategies to improve outreach is to provide educational material that is easy to understand using the Plain Language Guidelines. The current educational materials available at the project site had high readability scores making it difficult for patients with low HL to understand them. Furthermore, the readability tools used were neither evidence-based nor standardized. This mismatch resulted in unusable educational materials and poor care access and outcomes for persons with low HL. The purpose of this QI project was to provide a standardized and evidence-based method to measure the readability scores of PEMs used in the hospital. Standardization of the measurement of the reading level of the materials allowed for a more accurate reading score for PEMs, indicating whether revisions were necessary, and a better match to patient literacy.

Section 2: Background and Context

Introduction

Overall, population health is dependent on the existence of a culture of health and wellness. There have been private and public efforts to improve health outcomes, one of which has been the introduction of the Affordable Care Act of 2010. However, creating a healthy nation is a daunting task. Many efforts were put forth in legislation, including improving HL (McClure et al., 2016). President Obama signed the Plain Writing Act in 2010. The law required federal organizations to use a clear message that the public could comprehend and apply (Plain Language.Gov., n.d.).

Berkman et al. (2011) found an association between low HL and poor health, poor access to health care, and economic burden to patients and society in terms of increased hospitalizations and mortality. In a meta-analysis of the relationship between medications, appointments, and treatment adherence of patients with chronic illness, Miller (2016) reported a 14% higher nonadherence rate for patients with low HL skills compared to those with high levels of HL. Son and Yu (2016) examined the influence of HL on health and found that high HL is the strongest predictor of quality of life (QOL) in patients undergoing a percutaneous coronary intervention. The authors added that QOL improved the understanding of treatment. Additionally, Waite, Paasche-Orlow, Rintamaki, Davis, and Wolf (2008) studied the relationship of HL, social stigma, and medication adherence among human immunodeficiency virus patients. The authors reported that the stigma of low HL was an independent predictor of poor medication compliance.

Another impact of HL is self-efficacy, which is enhanced with higher HL (Lee et al., 2016). In contrast, low HL is associated with poor access to care (Kobayashi, Smith, & O'Conor, 2015), delay in completion of an advance care directive, increased costs, and negative outcomes (Fischer, Sauaia, Min, & Kutner, 2012). The National Network of Library of Medicine (NNLM, n.d.) identified that low HL of patients coupled with the high literacy score of PEMs could negatively impact screening and diagnosis of diseases such as cancer or diabetes. The agency asserted that high literacy scores of PEMs created difficulty for patients with low HL in treatment choices and the decision-making process. The issue of an inaccurately matched readability with the target population is widespread, which prompted my practicum site, a local inpatient acute care center in the Southern United States, to review their current PEM processes.

Evaluating the readability score using the CCI for all PEMs (as recommended by CDC 2015 Plain Language Guidelines) was the goal of this QI project. The long-term focused clinical question was as follows: In an urban inpatient hospital setting in the Southern United States, does adoption of the CCI for all PEMs (as recommended by CDC 2015 Plain Language Guidelines) improve patient satisfaction as measured by a pre- and postimplementation comparison of the patient satisfaction scores on the patient satisfaction questions, "When I left the hospital, I clearly understood the purpose for taking each of my medications?" and "During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?"

Kaphingst et al. (2012) determined the validity and reliability of the CCI were highly correlated with average ratings from 12 health literacy experts ($r = 0.89$, $p < .0001$). The authors reported that an exhaustive literature review of the concept, development of the operational definition of the tool, and a review of the theories behind HL led to the development of the CCI. The authors gathered expert feedback to determine what to include in the creation of the tool. The 10 criteria assessed by the CCI were plain language, clear purpose, whether graphics were appropriate for the PEM, consumer involvement, skill learning, audience suitability, instructions, information that was recent, evaluation method, and evidence-based content. Appendix A shows the full CCI index score worksheet to determine the readability of PEMs.

The CCI has four parts. In Part A, the evaluator verifies if the material was evidence-based and actionable and if the design was pleasing and corresponded to the message. Scoring consisted of *yes, no,* or *not applicable* (*NA*). If the answer was *yes*, the question received a score of 1 point. If the answer was *no*, then a score of 0 was assigned. Part A had a total possible score of 11 points. Part B had three questions with a total possible score of 3 points. The section was used to assess for the presence of behavioral recommendations in the PEM. Part C was used to determine the readability of numbers.

There were three questions about numbers with a maximum total score of 3 points (CDC, 2015). Numbers that did not require calculations and were explained in an easy to understand manner received a score of 1 point. In Part D the evaluator assessed the ability of the PEM to convey risks. The section had 3 questions and a maximum total score of 3 points. Overall, the CCI had a total maximum score of 20 points.

When scoring, the evaluator added the total number score of Parts A-D (or Part A only if Part B, C, or D do not apply), the total score as divided by 11. The evaluator multiplied the result by 100 to get the CCI score. A CCI score of 90% and above reflected a Plain Language Guideline compliant PEM. A score of 90% meant the PEM was written in plain language and was acceptable for use. A score below 89 indicated that the PEM was not written in easy to understand language and needed improvement. In contrast to other readability tools, the CCI met all the Plain Language Guidelines (CDC, 2015). The operational definition for CCI used in this doctoral project was the following: the CCI is a standardized and evidence-based tool that measures the readability score of PEMs

Concepts, Models, and Theories

Evidence-based practice (EBP) is essential in my work. The Sigma Theta Tau International (STTI, 2005) described nursing EBP as the incorporation of nursing's best practices available and the choices of the consumer served. One nursing theory and one model of nursing knowledge translation to practice was used in the project. The theory of goal attainment by King served as a theoretical framework for this project. The theory suggested that the focus of nursing is caring for patients. If a nurse provided knowledge and appropriate information to the patient, then goal achievement occurred (King, 2007). Likewise, if the message was understood, the patient can make decisions to meet his needs.

I used the plan, do, study, and act (PDSA) cycle as the framework to drive the change. The PDSA was first introduced by Walter Shewhart at Bell Laboratories and

applied in the health care as plan, do, check, and act (PDCA), which later was changed to PDSA by Langley et al. (2009) to emphasize study or analysis. The PDSA cycle is a way of testing small-scale change. The reason to test small changes was to determine the social impact, value, and complications associated with of the proposed change.

The first step was to plan what needed to change. The second part of the cycle was to implement (do). The third step was to analyze the data (study), and the last step was to perform (act) on what was learned from the process. If the cycle resulted in a successful outcome, the intervention can be implemented on a larger scale (Institute of Healthcare Improvement IHI, n.d.).

Relevance to Nursing Practice

There are high rates of low HL noted in different national surveys including the International Adult Literacy Survey (IALS) and National Adult Literacy Survey. However, Speros (2005) argued that these surveys do not include low HL related to health terminology; therefore, it is not clear how many more individuals have difficulty reading and comprehending health-related information and ideas related to health care settings. The statistics may be much worse compared to general literacy. The author contended that a person may be literate within the realms of nonhealth-related environments but may not be able to comprehend medical terms in the health care setting. The availability of printed PEMs mediates communication between the health care providers and patients during follow-up appointments.

Self-care instructions are necessary tools as a refresher, especially if patients are unable to access a healthcare professional in real-time (dos Santos et al., 2017), such as

may be the case of a patient living in a rural area. Clues for nurses that a patient may have low HL include the inability to complete written forms, missed follow-up care, inability to name medications or frequency and dosing of medications, and having significant others read health instructions (Speros, 2005). By the same token, information literacy may also afflict nurses.

With the influx of mobile devices in the digital era, nurses are now required to access medical information quickly. One of the most common use of mobile devices is to access web applications for quick drug review or disease information; information literacy can affect the nurses' ability to access medical data on these devices. Recently, nursing schools have added informatics competencies into the nursing curricula (Doyle, Furlong, & Secco, 2016) to further nursing practice. Efforts to increase HL competencies include continuing education programs, as well as a push for nurses to increase HL research and advocacy to help improve nursing practice (Speros, 2005).

Additional initiatives should ensure that all forms of communication from patient admission to discharge are provided in an easy to understand format in videos, face chat conferences, telehealth, or other forms of care. To guide patients with the emerging information technologies, the nurses themselves need to be proficient in providing the information and accessing the technology

Local Background and Context

The QI project was conducted in a 62-bed urban inpatient care setting in Southern Texas. According to the San Antonio Economic Foundation (SAEF, n.d.), in 2014, the city had approximately 1,440,900 people of whom 54.82% were Hispanic, and 45.18%

were nonHispanic. More than half of the population (62.44%) spoke English, and 34.21% spoke both English and Spanish. The 2014 average family income based on the San Antonio city data was $46,317, compared to the national average household earnings of $53,482. The San Antonio Public Library (SAPL, n.d.) reported the low literacy and illiteracy rate in the city is 25% with 12.5% illiterate and 12.5% functionally illiterate. San Antonio had the second highest illiteracy rate among the Texas cities. Based on my interactions, the demographics of the project organization hospital mirrored the reported city population demographics.

The high rate of low literacy is concerning because low literacy affects the economic conditions of people negatively, including the ability to network and gain social support (Egerter et al., 2009). Additionally, as Speros (2005) asserted, consumers with low literacy are likely to have low HL. Low HL is associated with higher tendency to seek medical emergency care, hospital readmissions, longer lengths of hospital stay (Kindig et al., 2004), and a higher risk of disease progression (Juzych et al., 2008). The previously cited literature indicated that low HL negatively affected the overall economic and societal environment through increased health care costs.

In the light of these concerns, health care organizations included benchmarking in their practice. The process helped providers lower health care costs by providing care based on best practices (Nash et al., 2015). This 62-bed acute long-term care facility has gained accreditation by The Joint Commission, Medicare, and American Association of Respiratory Care for quality respiratory care. My practicum site subscribed to National

Research Corporation (NRC) Health, a company that provides data interpretation and benchmarking services for consumers (Lifecare, personal communication, May 1, 2017).

In 2010, the Plain Language Writing Act (2010) required that federal agencies including Medicare used clear messages and materials that the public can understand and put into action (Plain Language.gov, n.d.). The Joint Commission also required informed consent using reading materials that were culturally sensitive and easy to understand (Howell, 2017). The U.S. Department of Human Services (HHS, 2010) developed an action plan to improve HL. The plan included partnerships at the governmental level and among communities and health care organizations, including embedding health education in school curriculum using the latest technology. These best practices are ways to achieve a culture of health and wellness. Progress can be made in overall health literacy by aligning efforts among all stakeholders such as health care employers, payers, and accrediting bodies (Baase et al., 2014).

To understand the focus of this QI project, the terms used in the proposal are defined as follows:

- *Cultural competency* is the skill to incorporate cultural beliefs, values, attitudes, customs, linguistic choices, and health practices of a patient to affect a positive health care outcome (HHS, 2001).
- *Functional illiteracy* is the inability to read, listen, write, or make mathematical calculations needed for community membership (HHS, 2001). HL is the capacity of the individual to obtain, process, and understand basic

health information and services needed to make health decisions and take appropriate action (HHS, 2001).

- *Illiteracy* and *low literacy* are used interchangeably to indicate the inability to comprehend written and oral instructions in order to function in making day-to-day decisions (HHS, 2001).
- *Information literacy* is the ability to comprehend informatics technology to function in day-to-day activities (Doyle et al.2016).
- *Limited HL* is having difficulty reading or following simple health instructions (HHS, 2001).

Role of the DNP student

My role as a DNP was to create innovative strategies and implemented evidence-based knowledge into practice. I acquired competencies based on the DNP essentials set forth by the American Association of Colleges of Nursing (AACN) to build EBP that improved organizational and patient outcomes. I analyzed issues, used information technology to advance practice, evaluated policies, and advocated for improved health care outcomes within the facility.

More importantly, I collaborated with other disciplines at the hospital; practice health prevention strategies, and provided leadership in the community, acute, and long-term care settings to promote best patient outcomes across the continuum of care (AACN, 2006).

As a nurse practitioner, I have seen the negative impact of low HL in the discharge process. Patients were readmitted soon after discharge because they lacked the

understanding of self-care instructions. The patients did not have a clear understanding of what was expected and why. The misunderstanding resulted in missed clinic appointments because of lack of understanding of the importance of follow-up care. Adverse outcomes were a testament to the need for reevaluation of care processes, including HL appropriate PEMs. As the project coordinator, I implemented and managed the QI project in my practice setting. I provided the tool, education, and guidance for assessing the reading scores of PEMs using the CCI.

Role of the Project Team

The project team comprised of the chief nurse officer (CNO), director of QI, staff, a patient as a stakeholder and I. The team brainstormed on how to improve HL using Plain Language Guidelines that would lead to higher patient satisfaction score. The CNO or the QI director provided patient satisfaction survey data to review. The team analyzed the pre-post patient satisfaction survey to determine if change has taken place after implementation.

I gave background information to the team members on the HL from evidence-based literature. The QI director shared her expertise from QI standpoint. The final approval came from the CNO (as a representative of the administration). Each member reviewed the timeline of the project. The team agreed upon a timeline to provide feedback. I recorded and coordinated the meeting and each member provided feedback.

Summary

The HL demand of the healthcare system exceeds the HL ability and skills of most Americans. This doctoral project outlined the gap in practice, which was the

variability of readability tools used at the hospital to rate PEMs. Adding to the barrier in practice was the fact that the readability tools were not evidence-based nor standardized and the patients served by the hospital have low HL. Lastly, the national health care agencies have different expectations on the recommended reading score of PEMs. In a city with a high illiteracy rate, practicing a universal precaution, which was facilitating the use of PEMs that were easy to understand, was one of the best ways to ensure population access to care.

Section 3: Collection and Analysis of Evidence

Introduction

The city of San Antonio, Texas was reported to have a 25% illiteracy/low literacy rate, which was the second highest among the Texas cities (SAPL, n.d.). This information was concerning to the project site because of the increased costs and negative overall health outcomes that result from low HL. Furthermore, the facility used the traditional tools to assess the readability score of PEMs, which resulted in inconsistency in the reading score of the PEMs and a mismatch between the design of the PEMs and the patients' HL.

The mismatch has resulted in PEMs that were unusable and ineffective for patient education. The purpose of the QI project was to adopt the CCI, which is a standardized and evidence-based readability tool to assess readability scores of the hospital's PEMs. .

Practice-Focused Question

The 62-bed hospital in Southern Texas used traditional tools to assess the readability score of its PEMs. The tools were not standardized, making the score inaccurate and the PEMs unusable. The purpose of this QI activity was to adopt a readability tool that was a standardized and evidence-based to assess the reading scores of the PEMs in order to replace the PEMs as necessary for better patient outcomes. The long-term practice-focused question was as follows: In an urban inpatient hospital setting in the Southern United States, does the adoption of the CCI for all PEMs (as recommended by CDC 2015 Plain Language Guidelines) improve HL as reflected by patient satisfaction measured by a pre- and postimplementation comparison of the scores

on the NRC survey questions, “When I left the hospital, I clearly understood the purpose for taking each of my medications?” and “During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?” The use of a standardized tool indicated accurately whether the current PEMs were easy to read and understandable for the patient population with low HL.

Sources of Evidence

I used three sources of evidence in this QI project. The CCI served as an alternative method to the traditional tools used in the hospital for analyzing the readability of PEMs. The first source of evidence for the project was the formative review by the team of a new PEM before its implementation. The review was to determine if the PEM adhered to the Plain Language Guidelines. The project team used the CCI as a guide (see Appendix A). The second source of evidence was the project team’s evaluation of my leadership of the project. The third source of evidence was the pre- and postimplementation scores on the NRC patient satisfaction survey questions. The scores determined if the PEM that followed the Plain Language Guidelines had a positive impact on the patients’ satisfaction at 3 months postimplementation.

Published Outcomes and Research

Listed in Appendix B are the databases, search terms, and search engines I used in the literature review for this QI project. The search included only articles written in English and published between 2001 and 2017. The literature gathered included systematic reviews and peer-reviewed articles from authoritative organizations. The authoritative agencies provided robust data related to the current movement to improve

HL nationwide. The CCI website created by the CDC provided resources to help plan, develop, and implement the project intervention.

Evidence Generated for the Doctoral Project

Descriptive statistics was used to analyze the doctoral project as a formative evidence. The analysis included the team members' feedback on the new PEM based on application of the CCI worksheet. I collected the written feedback of the team relating to the satisfaction of my leadership as another source of evidence (see Appendix D). The summative data consisted of the comparison of pre and postimplementation scores on the patient satisfaction survey items, "When I left the hospital, I clearly understood the purpose for taking each of my medications?' and "During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?"

Procedures. The QI process started with the creation of a team. The facility's CNO, the director of the QI department, the nursing staff, and I were part of the team. The project team brainstormed how to improve the patient experience. The goal of the project was to increase the patient satisfaction survey scores to above or within the organization benchmarks (77.7% and 90.9% respectively) in 3 months after implementing the PEMs evaluation. To analyze the understanding of patients within the context of the PEM, the facility and I created discharge instructional material using the Plain Language Guidelines.

The project team assessed the readability scores of the PEMs using the CCI as a readability tool. These PEMs, were given to the patients upon discharge after approval by

the administration.The team compared the patient satisfaction survey scores before the QI implementation to the patient satisfaction survey's postimplementation scores. The team determined if postimplementation scores that reflected the used of PEM written in Plain Language Guidelines created an impact on patients' understanding of the written instruction.

The project team analyzed the QI scores 3 months after the implementation of the new PEMs because rapid cycle occurred over 3 months The pre- and postimplementation outcome used empirical benchmarking strategy. In the empirical approach, the NRC Health compared the practicum site's patient satisfaction survey against the results of other institutions that treat similar patients.

The team monitored the 2 HL questions. On the first HL metric, "When I left the hospital, I understood the purpose of taking each of my medicines," the facility received a score of 58.2% versus the benchmark of 77.7%. On the second patient satisfaction survey metric, "During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?," the facility received a score of 73.1% compared to the 90.9% national benchmark. The goal was to meet or exceed the national benchmarks of 77.7% and 90.9% on these survey metrics respectively.

Ethics Protections. The doctoral project started upon receipt of approval (number 10-30-17-0520267) from the Institutional Review Board (IRB) of Walden University. The practicum site provided the deidentified aggregate patient satisfaction data for project

evaluation. The project design followed the joint QI project guidelines of the Walden IRB and the DNP program.

Analysis and Synthesis

The project team assessed the readability scores of the new PEM using the CCI as a readability validation tool. The team gave the PEM to the patients upon discharge after approval by administration. The team analyzed and compared the patient satisfaction survey scores on the two NRC questions before and after implementation of the action plan against the NRC benchmarks. The results showed that the adoption of the Plain Language Guidelines, as evidenced by use of the CCI-standardized PEM, resulted in improved patient satisfaction scores. See Appendix E for the sample of stakeholders' meeting minutes. Presented in Appendix F was the written feedback from the project team that reflected the use of the Plain Language Guidelines.

Summary

Hospitalization is often marked by vulnerabilities and complexities. Multiple stressors can occur including changes in medications, lifestyle modifications, and increased caregiving or self-care needs. Such challenges can be difficult to understand, especially for patients with low HL. Providing easy to understand instruction on self-care at discharge is one way to eliminate the barrier of low HL. Implementation of the use of the CCI improved readability of the educational materials and facilitated the patient understanding of postdischarge medication and other self-care expectations.

Section 4: Findings and Recommendations

Introduction

A strategy for improving community health includes reaching out to the vulnerable populations. Ensuring that explicit health instructions are delivered is one way to provide support to vulnerable populations to achieve health. Barriers to health include low HL and lack of coordination of care. These factors resulted in the inability to access medications and preventive care, leading to poor clinical outcomes and higher costs of care. Betancourt et al. (2014) reported that low HL alone was associated with higher medical use as well as higher costs of care. The variability of readability scores of PEMs compounded low HL .Health care agencies commonly used different readability tools to evaluate PEMs, including the Flesh-Kincaid readability tool, the SMOG index, the PMOSE/IKIRSCH measure, the Coleman-Liu Index, the New Dale-Chall Readability Formula, and the PEMAT. Each tool measured different aspects of the PEMs. Moreover, the consumers of education materials used these instruments that did not assess risk nor evaluated whether the information provided helped patients to act (McClure et al., 2016).

The purpose of this project was to adopt a standardized and evidence-based readability tool using the CCI to assess the reading score of the PEMs. The CCI followed the CDC Plain Language Guidelines to ensure that the PEMs were easy to understand.

The long-term practice-focused question was as follows: In an urban inpatient hospital setting in the Southern United States, does the adoption of the CCI for all PEMs (as recommended by CDC 2015 Plain Language Guidelines) improve HL as reflected by patient satisfaction measured by a pre and postimplementation comparison of the scores

on two satisfaction survey questions, “When I left the hospital, I clearly understood the purpose for taking each of my medications?” and “During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?”

The patients voiced their unmet needs as reflected in the patient satisfaction survey which, prior to the intervention, did not reach the benchmark for the two survey questions. The facility received a score of 58.2% versus the national benchmark of 77.7%, and 73.1% compared to the 90.9% national benchmark (NRC, personal memo June 1, 2017). The aim of the QI project was to determine if the adoption of CCI improved HL, as reflected by patient satisfaction scores equal to or above the benchmark 3-months post implementation.

Summary of the Sources of Evidence and Analytical Strategies

The goal of the facility is to meet the needs of the community (Lifecare, personal memo May 5, 2017). To determine if the requirement was met, this 62-bed acute long-term care facility subscribed to NRC Health to monitor the patient satisfaction scores. The two survey questions related to HL were “When I left the hospital, I clearly understood the purpose of taking each of my medications?” and “During your hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?” The NRC used an empirical strategy to benchmark the metrics. In the empirical approach, the company assessed the results of the facility’s patient satisfaction survey against the results of other institutions that treat similar patients. The project team met and discussed the commonly used PEMs at discharge.

The identified topics included (a) medication instruction; (b) information on common diagnoses such as diabetes, wound care, hypertension, and stroke; and (c) nutritional guidelines. The team evaluated the readability score of the new PEMs. The team evaluated the medication instruction as a PEM and the reading score using the CCI. The team used the score sheet criteria on Parts A, B, and C of the CCI. The team did not use Part D, as the PEMs analyzed did not discuss risk. The project team assessed the presence of primary message (clear purpose), call to action (consumer involvement), use of active voice (skill learning), and everyday words (audience suitability). The team determined if the PEM use bulleted or numbered lists and the organization of message (organized and explicit purpose). Additionally, the team assessed for the presence of a message summary and, lastly, if the PEM was evidence-based. These were the qualities needed to confirm that the PEM used the Plain Language Guidelines.

Lastly, Part C of the CCI assessed if numbers were easy to interpret and did not involve calculation. A score was assigned to each item. Part A had a total possible score of 11 points. Part B had three questions with an overall possible score of 3 points. Part C was used to determine the readability of the numbers. There were three questions about numbers with a maximum total score of 3 points (CDC, 2015). The numbers that did not require calculations and were explained in easy to understand language received a score of 1 point. Overall, the CCI has a total maximum score of 20 points. Scoring consisted of *yes* or *no* for Questions 1 through 18 and *yes, no,* or *not applicable* (*NA*) for Questions 19

and 20. If the answer was *yes*, the question receives a rating of 1 point. If the answer was *no*, then a score of 0 was assigned.

When scoring, the total score of Parts A-D (or Part A only if Parts B, C, or D do not apply) was divided by 11. The result was multiplied by 100 to get the CCI score. A CCI score of 90% and above reflects a Plain Language Guideline compliant PEM. A score of 90% meant the PEM was written in plain language and was acceptable for use. A score below 89 indicated that the PEM was not composed in easy to understand language and needed improvement (CDC, 2015). The total score for the medication discharge instruction was 118, which reflected a PEM that followed the Plain Language Guidelines. A sample analysis of the PEM using the CCI is presented in Appendix C

The team provided PEMs that followed the Plain Language Guidelines to patients at discharge after the rapproval from the administration. The practicum facility then invited the patient to participate in a patient satisfaction survey provided at discharge. If the patient opted to participate, the patient mailed the survey to the NRC. The practicum site accessed the aggregated survey results in real time through the NRC website.

Findings and Implications

Three months before the implementation of the project in June 2017, the patient satisfaction survey score was 58.2% versus the benchmark of 77.7% for the first metric, "When I left the hospital, I clearly understood the purpose for taking each of my medications?" During the first month of the implementation of the action plan in September 2017, the facility received a score of 90.7% versus the average benchmark of 77.7%, indicating an improvement in the satisfaction score.

However, for the second month after the implementation of the action plan, the facility received a score of 75% against the average national benchmark of 77.7%. The score did not meet the benchmark. In the last month of the PDSA cycle, the facility received a score of 80% versus the average benchmark of 77.7%, indicating an improvement.

In June 2017, 3 months before the implementation of the action plan for the second metric, “During your hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?,” the survey score was 73.1% compared to the national benchmark of 90.9%. In the first month after the implementation of the Plain Language Guidelines, in September 2017, the patient satisfaction survey score increased to 83.3%, though it did not meet the benchmark of 90.8%. However, the score reflected an increase in the patient satisfaction score compared to 3 months before (83.3% vs. 73.1%).

In the second month after implementation, the facility received a score of 66.7%, which did not meet the benchmark 90.8%. Overall, the low score may have been due to inconsistency in providing the new PEMs to discharged patients as the staff were in the transition and adoption phase of the new directive. The third month of the PDSA cycle implementation of the new Plain Language-compliant PEMs reflected an improvement (100%) in the patient satisfaction scores.

Unanticipated Limitations or Outcomes and Potential Impact on Findings

The second month after the implementation of the action plan (October), the facility announced the roll out of electronic medical record (EMR) at the practicum site. The project team attended the super user seminar and deemed that the new medication instruction template embedded in the EMR followed the Plain Language Guidelines. The EMR included PEMs that were written following the Plain Language Guidelines in the menu as well. These PEMs were printed from the EMR and given to the patients at discharge. The implementation of the new EMR created a shift of focus and energy by the staff into navigating the new charting system. The disruption impacted the distribution of the PEM negatively at discharge. The distraction resulted in patient satisfaction scores below the benchmark. The reason was determined to be difficulty in finding the PEMs tab in the EMR.

A meeting was held to discuss how to improve the use of the EMR. Suggested actions included creating champions to teach staff where to find the PEMs. The education resulted in successfully meeting the score above the average benchmark for the two questions on the last month of the PDSA cycle. It was recommended to the team to continue the PDSA cycle using the same process for at least another 3 months after the staff are comfortable with the use of the EMR to sustain improvement in patient satisfaction scores.

Implications for Individuals, Communities, Institutions, and Systems

The adoption of the CCI tool to measure PEMs reflected an improvement in HL as indicated in the patient satisfaction score. The use of the CCI was a confirmation of

evidence-based improvement that was translated to practice. The translation took place within the microsystem. Kosnic and Espinosa (2003) described the microsystems as the frontline health care units that produced change by providing quality care, and effective and efficient processes. The microsystem is the agent of change within the organization or macrosystem. Components of the microsystem are having a common theme or language, enabling of mutual goals, and sharing information. In the case of low HL, using the Plain Language Guidelines as a common and only language used in the microsystem resulted in perceived dependability and consistency.

The loss of variability translated into improved relationships with the external customers (systems). The change at the microsystem level created a transformation at the macrosystem or organizational level as reflected in the benchmarking scores on the third month (outcome measures) of the PDSA cycle. The practice change improved patient satisfaction at the facility as well as the delivery system through lower cost of care by the use of PEMs that were effective in providing access to care.

Implications for Positive Social Change

The patient experience survey showed that the adoption of the CCI improved HL. The improvement was shown in the increased patient satisfaction scores on the two questions that pertained to HL. The facility met the process requirement of the consumers and the needs of the community. A process requirement is defined as the criterion from which effectiveness of a process is evaluated. In this case, what was the language requirement that was considered easy to understand and can be used by the consumer? The acceptable process requirement was dependent on three perspectives. One

requirement was the perceptions of the consumers: the second requirement was the perceptions of the stakeholders and, lastly, was the perceptions of the marketplace.

Criteria the patients perceived as acceptable (voice of the customer) had to be in alignment with the perception of the stakeholders on what language requirement was acceptable (voice of the process). To solve the gap, the two perspectives have to align as close as possible to limit variability (White & Dudley-Brown, 2016).

The facility has to use of Plain Language Guidelines consistently. If there was a variation in readability scores of PEMs, then the patient perceived the process as unpredictable and not dependable, which resulted in dissatisfaction as reflected in the pre implementation patient satisfaction scores. Minnick (2009) stated that it is crucial to determine the outcomes of the care provided. Additionally, White and Brown-Dudley (2016) reasoned that outcomes data help providers, payers, and the organization understand the results of the services provided.

The facility can use data to compare standard levels of performance such as in benchmarking. Benchmarking determines if the care or a service met the standard of practice. The next step was to sustain the gain from this project. Consistency to limit variation is essential. Clearly, after removal of the variability in the process, satisfaction was achieved. This practice change promoted social justice by providing equal access and opportunity to health for all.

Recommendations

The first recommended solution is the consideration to use CCI as readability assessment tool in other general practice areas in other facilities. The facility can use

PDSA cycle to measure outcomes to detect organizational improvements. Based on our findings, I recommend the use of the CCI to assess the readability scores of PEMs. The CCI score sheet and instructions are listed in Appendix A as a resource for interested practitioners. The score sheet included guidelines on its use.

Secondary Products

The Plain Language Guidelines online training for the staff and stakeholders are helpful as a secondary product in guiding and understanding the guidelines. The practitioners can find online best practices in the governmental agencies and the Plain Language Guidelines websites. The training is short and does not require a lot of time. Although the facility has PEMs that follow the Plain Language Guidelines, it is imperative that the staff are able to determine what constitutes a readable PEM and what does not. A list of training sites is included in Appendix F

The new PEMs that follow the Plain Language Guidelines are now integrated into the EMR menu. The integration allowed the staff to print out PEMs at discharge. A staff nurse can follow the step without additional training needed once the staff is familiar with using the EMR. The improvement of HL was the outcome measure. The team evaluated the outcome by benchmarking the feedback from the patient satisfaction survey questions that pertain to HL. The administrative decision makers who were not involved in the planning of the discharge program can assign and supervise the implementation and evaluation without additional resources or planning.

Contribution of the Doctoral Project Team

The DNP project process started with uncertainty. I spent the first few weeks meeting and brainstorming with the stakeholders about the gaps in practice apparent at the facility. The QI director identified the QI indicators that were currently monitored. One of the areas that needed improvement included the low patient satisfaction survey scores. Once the team decided to improve satisfaction scores that pertained to HL, I presented steps on how to improve the process. My preceptor who was the CNO of the facility was very open to the suggestions.

The members of the team collaborated. The team comprised of the CNO, QI director, nurses, and I. I led the initiative. The QI director contributed aggregate data for the me to analyze. I educated the team on the use of the CCI. The CCI seen in Appendix A served as the module for teaching staff using the instructions provided. The project team assessed the PEMs for readability scores.

I presented the benefits of using the Plain Language Guidelines in improving access, cutting the cost of care by avoiding the use of ineffective PEMs, and enhancing patient satisfaction as well. I plan to advocate for the use Plain Language Guidelines through publications and community presentations

Strengths and Limitations of the Project

In scientific research, extensive data are gathered at one time, while in improvement research, small doses of data are collected over time. The strength of a QI project using the PDSA model was it allowed short cycling of the improvement process. The short cycle gave a glimpse of the possible result and complications without

compromising a significant amount of resources. The second strength of the study was the project was small with limited risks, which garnered the quick buy-in of the administration.

Lastly, the short cycling was a great option because the process resulted in small doses of data over time (IHI, n.d.) without a sample size requirement to detect improvement. Overall, the QI project opened the minds of the stakeholders and provided an easy, yet inexpensive, way to address HL and improve patient experience satisfaction. The limitation of this improvement process was that the I was the sole point of contact for this project.

I recommended champions to ensure that the project was moving forward. Second, the HL project performed only one PDSA cycle. Future projects addressing HL and using similar methods should be considered and should allow several PDSA cycles to evaluate not just improvement but if permanent change has taken place. To sustain the gains from this improvement project, I recommended that the stakeholders continue several PDSA cycles to gain data points for a more robust analysis.

Section 5: Dissemination Plan

The project team reviewed the findings of the QI project at a meeting with the CNO. The recommendations included (a) the creation of champions to ensure the inclusion of PEMs at discharge, (b) I encouraged the use of super user to help the staff to familiarize themselves with the location of the PEMs in the new EMR. Overall, the feedback from the stakeholders survey reflected the satisfaction of the DNP leadership. A sample of the review is listed in Appendix D.

Health literacy affects the individual patients, communities, and the society. Therefore, the topic and outcomes of the project have a broad potential audience including public health organizations, policy makers, and international and academic healthcare organizations. The venues to disseminate this QI project include public health and QI conferences

Analysis of Self

My passion has always been in public health and the QI process. The DNP project gave me the opportunity to become a scholar, a project manager, and an agent of change. My knowledge of the bigger picture and learning to analyze gaps in practice using different evaluation tools made me confident to lead change. My goal is to get involved in QI initiatives to drive change at the organizational level and to influence policy change at my facility.

Insights Gained on the Scholarly Journey

In the beginning of the project, the challenges seem insurmountable. Coordinating the project was one of the challenges and trying to get the buy-in of the stakeholders such

as the nurses was very difficult. The administrators did not have much time to spare due to conflicting demands, which created delays. The timeline to complete the project was challenging as well. The organization had multiple ongoing performance indicators that needed improvement. HL, though significant, was not at the top of the list to improve at the practicum site. However, once I took ownership of this initiative by identifying gaps in practice through process mapping, the CNO engagement occurred.

School and family life required more creativity than I anticipated. I learned to use my time with intention. The great scholars at Walden University gave me insights and guidance to get where I needed to be. The supportive atmosphere made my journey lighter.

Summary

The HL demand of the healthcare system exceeds the ability and skills of most Americans. This doctoral project has outlined the gaps in practice, which was the nonevidence-based and variable readability tools used in the hospital to rate PEMs. Compounding the gap in practice included the low HL of the population served by the hospital. Additionally, the national health care agencies have different expectations on the recommended reading score of PEMs. In a city with a high illiteracy rate, practicing a universal precaution with the use of PEMs that are easy to understand, is one of the best ways to ensure access to care for all.

References

American Association of Colleges of Nursing. (2006). *AACN essentials of doctoral education for advanced nursing practice.* Washington, D C: Author.

Azer, S. A., AlOlayan, T. I., AlGhamdi, M. A., & AlSanea, M. A. (2017). Inflammatory bowel disease: An evaluation of health information on the internet. *World Journal of Gastroenterology, 23*(9), 1676. doi:10.3748/wjg.v23.i9.1676

Baase, C., Flynn, J., Goetzel, R., Pronk, N., Terry, P., & White, J., (2014). *Environmental scan: Measuring a culture of health.* Retrieved from https://www.researchgate.net/publication/268445080_Environmental_Scan_Measuring_a_Culture_of_Health. doi: 10.13140/RG.2.1.3280.1760

Bailey, C., Brega, A. G., Crutchfield, T. M., Elasy, T., Herr, H., Kaphingst, K., . . . & Schillinger, D. (2014). Update on health literacy and diabetes. *Diabetes Education, 40*(5), 581–604. doi:10.1177/0145721714540220

Baker, D. P., Leon, J., Smith Greenaway, E. G., Collins, J., & Movit, M. (2011). The education effect on population health: A reassessment. *Population and Development Review*, *37*(2), 307-332. doi:10.1111/j.1728-4457.2011.00412.x

Badarudeen, S., & Sabharwal, S. (2010). Assessing readability of patient education materials: Current role in orthopaedics. *Clinical Orthopaedics and Related Research, 468*(10), 2572-2580. doi:10.1007/s11999-010-1380-y

Bauer, C. (2010). *The national action plan to improve health literacy*. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion.

Retrieved from https://health.gov/communication/hlactionplan/pdf / Health_Literacy_Action_Plan.pdf

Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine, 155*(2), 97-107. doi: 10.7326/0003-4819-155-2-201107190-00005

Betancourt, J. R., Corbett, J., & Bondaryk, M. R. (2014). Addressing disparities and achieving equity: Cultural competence, ethics, and health-care transformation. *CHEST Journal, 145*(1), 143-148. doi:10.1378/chest.13-0634498

Bobian, M., Kandinov, A., El-Kashlan, N., Svider, P. F., Folbe, A. J., Mayerhoff, R., & Raza, S. N. (2016). Mobile applications and patient education: Are currently available GERD mobile apps sufficient? *The Laryngoscope, 123*(1), 90–96. doi: 10.1002/lary.26341.

Brega, A. G., Ang, A., Vega, W., Jiang, L., Beals, J., Mitchell, C. M., … Roubideaux, Y. (2012). Mechanisms underlying the relationship between health literacy and glycemic control in American Indians and Alaska Natives. *Patient Education and Counseling*, *88*(1), 61-68. http://dx.doi.org/10.1016/j.pec.2012.03.008

Center for Disease Control and Prevention (CDC, 2015). The Clear Communication Index. Retrieved from cdc.gov/ccindex/tool/index.html

Doyle, G. J., Furlong, K. E., & Secco, L. (2016). Information literacy in a digital era: Understanding the impact of mobile information for undergraduate nursing students. *Nursing Informatics, 2016*, 297. doi:10.3233/978-1-61499-658-3-397

Egerter, S., Braveman, P., Sadegh-Nobari, T., Grossman-Kahn, R., & Dekker, M. (2009). *Education matters for health* (Issue Brief No. 6).. Retrieved from Commission to Build a Healthier America website: http://www.commissiononhealth.org/PDF / c270deb3-ba42-4fbd-baeb-2cd65956f00e/Issue%20Brief%206%20Sept%2009 %20-%20Education%20and %20Health.pdf

Fischer S. M., Sauaia A., Min, S-J., & Kutner, J. (2012). Advance directive discussions: Lost in translation or lost opportunities? *Journal of Palliative Medicine, 15*(1), 86-92. doi:10.1089/jpm.2011.0328

Fowler, F. J., Levin, C. A., & Sepucha, K. R. (2011) Information and involving patients to improve the quality of medical decisions. *Health Affairs, 30*(4), 699-706. doi: 10.1377/hlthaff.2011.0003

Frieden, T. R. (2014). Six components necessary for effective public health program implementation. *American Journal of Public Health, 104*(1), 17-22. doi:10.2105/AJPH.2013.301608

Friedman, D. B., & Hoffman-Goetz, L. (2006). A systematic review of readability and comprehension instruments used for print and web-based cancer information. *Health Education & Behavior, 33*(3), 352-373. Doi-org.ezp.waldenulibrary.org/10.1177/1090198105277329

Haun, J. N., Patel, N. R., French, D. D., Campbell, R. R., Bradham, D. D., & Lapcevic, W. A. (2015). Association between health literacy and medical care costs in an integrated healthcare system: A regional population based study. *BMC Health Services Research, 15*(1), 249. doi:10.1186/s12913-015-0887-z

Howell, G., (Producer). (2017, March 29) *Take 5 informed consent beyond a signature* [Audio podcast]. Retrieved from http://hwcdn.libsyn.com/p/a/9/9 / a991a1e02ef5a3a9/Take_5_Informed_Consent.mp3? c_id=11751598&expiration=1495994514&hwt=d946a2fd78b6986607cf193a603e a6d7

Imogene M. King. (2007). King's Conceptual System, Theory of Goal Attainment, and Transaction Process in the 21st Century. *Nursing Science Quarterly*, *20*(2), 109–111. doi.org/10.1177/0894318407299846

Institute of Healthcare Improvement. (n.d.). *How to improve*. Retrieved from http:// www.ihi.org/resources/Pages/HowtoImprove/ ScienceofImprovementTestingChanges.aspx

Institute of Healthcare Improvement. (Producer). (n.d.). *On demand: Building skills in data collection and understanding variation* [Video file]. Retrieved from http:// www.ihi.org/education/WebTraining/OnDemand/DataCollection_Variation/Pages/ default.aspx

Juzych, M. S., Randhawa, S., Shukairy, A., Kaushal, P., Gupta, A., & Shalauta, N. (2008). Functional health literacy in patients with glaucoma in urban settings. *Archives of Ophthalmology*, *126*(5), 718–724. doi:10.1001/archopht.126.5.718

Kaphingst, K. A., Kreuter, M. W., Casey, C., Leme, L., Thompson, T., Cheng, M. R., . . . & Culbert, A. (2012). Health Literacy INDEX: Development, reliability, and validity of a new tool for evaluating the health literacy demands of health information materials. *Journal of Health Communication, 17*(3), 203-221. doi: 10.1080/10810730.2012.712612

Kapoor, K., George, P., Evans, M. C., Miller, W. J., Liu, S. S. (2017). Health literacy: Readability of ACC/AHA online patient education material. *Cardiology,* (138), 36-40. doi:10.1159/000475881

Kindig, D. A., Panzer, A. M., & Nielsen-Bohlman, L. (Eds.). (2004). *Health literacy: A prescription to end confusion*. Washington, DC: National Academies Press.

King, I. (2007). King's Conceptual System, Theory of Goal Attainment, and Transaction Process in the 21st Century. *Nursing Science Quarterly*, *20*(2), 109–111. https://doi.org/10.1177/0894318407299846

Kobayashi, L. C., Smith, S. G., O'Conor, R., Curtis, L. M., Park, D., Wagner, C. von, … Wolf, M. S. (2015). The role of cognitive function in the relationship between age and health literacy: a cross-sectional analysis of older adults in Chicago, USA. *BMJ Open, 5*(4), e007222. https://doi.org/10.1136/bmjopen-2014-007222

Kosnik, K. L., & Espinosa, A. J. (2003). Microsystems in health care. Part 7. The microsystem as a platform for merging strategic planning and operations. *Joint Commission Journal on Quality and Safety, 29*(9), 452-459. Retrieved from http://clinicalmicrosystem.org/wp-content/uploads/2014/05/JQIPart7.pdf

Langley, G. J., Moen, R. D., Nolan, K. M., Nolan, T. W., Norman, C. L., & Provost, L. P. (2009). *The improvement guide: A practical approach to enhancing organizational performance*. Somerset, NJ: John Wiley & Sons.

Lee, Y. J., Shin, S. J., Wang, R. H., Lin, K. D., Lee, Y. L., & Wang, Y. H. (2016). Pathways of empowerment perceptions, health literacy, self-efficacy, and self-care behaviors to glycemic control in patients with type 2 diabetes mellitus. *Patient Education and Counseling, 99*(2), 287-294. doi:10.1016/j.pec.2015.08.021

McClure, E., Ng, J., Vitzthum, K., & Rudd, R. (2016). A mismatch between patient education materials about Sickle Cell Disease and the literacy level of their intended audience. *Preventing Chronic Disease*, *13*. doi:10.5888/pcd13.150478

Miller, T. A. (2016). Health literacy and adherence to medical treatment in chronic and acute illness: A meta-analysis. *Patient Education and Counseling, 99*(7), 1079-1086. doi:10.1016/j.pec.2016.01.020

Minnick, A. F. (2009). General design and implementation challenges in outcomes assessment. In R. M. Kleinpell (Ed.), *Outcome assessment in advanced practice nursing* (2nd ed., pp. 107-118). New York, N.Y.: Springer.

Nash, D. B., Fabius, R. J., Skoufalos, A., & Clarke, J. (2015). *Population health*. Burlington, MA: Jones & Bartlett Publishers.

National Network of Libraries of Medicine (NNLM, n.d.) *Health Literacy*. Retrieved from https://nnlm.gov/professional-development/topics/health-literacy

Imogene M. King. (2007). King's Conceptual System, Theory of Goal Attainment, and Transaction Process in the 21st Century. *Nursing Science Quarterly*, *20*(2), 109–111. https://doi.org/10.1177/0894318407299846

Plain Language.Gov. (n.d.). *Plain language-It's the law*. Retrieved from http://www.plainlanguage.gov/plLaw/index.cfm

Prabhu, A. V., Crihalmeanu, T., Hansberry, D. R., Agarwal, N., Glaser, C., Clump, D. A., & Beriwal, S. (2017). Online palliative care and oncology patient education resources through Google: Do they meet national health literacy recommendations? *Practical Radiation Oncology 88*(1), 22-23. doi:10.1016/j.prro.2017.01.013.

San Antonio Economic Development Foundation ([SAEDF], n.d.). *Demographics*. Retrieved from www.sanantonioedf.com/living/demographics/

San Antonio Public Library (n.d.). *Community profile - San Antonio Public Library*. Retrieved July 7, 2017 from http://mysapl.org/Portals/6/Files/About/StrategicPlan/CommunityProfile.pdf

dos Santos, J. E. M., Brasil, V. V., Moraes, K. L., Cordeiro, J. A. B. L., de Oliveira, G. F., Bernardes, C., . . . Silva, A. M. T. C. (2017). Comprehension of the education handout and health literacy of pacemaker users. *Revista Brasileira de Enfermagem; Brasília*, *70*(3), 633-639, 661-667. doi:10.1590/0034-7167-2016-0336

Sentel, T., Zhang, W., & Ching L.K. (2015). Insights in public health: The importance of considering educational inequity and health literacy to understand racial/ethnic

health disparities. *Hawaii Journal of Medicine and Public Health, 74*(7), 244-247. Retrieved December 1, 2017 from https://www.ncbi.nlm.nih.gov/pmc/articles / PMC4507365/pdf/hjmph7407_0244.pdf

Sigma Theta Tau International. (2005). *Position statement on evidence based nursing.* Retrieved from https://www.nursingsociety.org/why-stti/about-stti/position-statements-and-resource-papers/evidence-based-nursing-position-statement

Sollecito, W. A., & Johnson, J. K. (2011). *McLaughlin and Kaluzny's continuous quality improvement in health care*. Somerset, NJ: Jones & Bartlett Publishers.

Son, Y. J., & Yu, H. Y. (2016). Influence of health literacy on HRQoL in patients after PCI. *Western Journal of Nursing Research, 38*(12), 1611-1626. doi:10.1037/ t17922-000.

Speros, C. (2005). Health literacy: Concept analysis. *Journal of Advanced Nursing*, *50*(6), 633-640. doi:10.1111/j.1365-2648.2005.03448.x

Stiefel, M., & Nolan, K. (2012). A guide to measuring the triple aim: Population health, experience of care, and per capita cost. Retrieved July 1, 2017 from http:// www.ihi.org/resources/Pages/IHIWhitePapers/ AGuidetoMeasuringTripleAim.aspx

Thomson, M. D., & Hoffman-Goetz, L. (2007). Readability and cultural sensitivity of web-based patient decision aids for cancer screening and treatment: A systematic review. *Medical Informatics and the Internet in Medicine, 32*(4), 263-286. doi: 10.1080/14639230701780408

Unaka, N. I., Statile, A., Haney, J., Beck, A. F., Brady, P. W., & Jerardi, K. E. (2017). Assessment of readability, understandability, and completeness of pediatric hospital medicine discharge instructions. *Journal of Hospital Medicine, 12*(2), 98-101. doi:10.12788/jhm.2688

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (HHS, 2010). *National action plan to improve health literacy.* Washington, DC: Author.

Waite, K. R., Paasche-Orlow, M., Rintamaki, L. S., Davis, T. C., & Wolf, M. S. (2008). Literacy, social stigma, and HIV medication adherence. *Journal of General Internal Medicine, 23*(9), 1367. doi:10.1007/s11606-008-0662-5

White, K. M., & Dudley-Brown, S. (2016). *Translation of evidence into nursing and health care practice (2nd ed.).* New York, NY: Springer.

Williams, D. R., & Collins, C. (2001). Racial residential segregation: A fundamental cause of racial disparities in health. *Public Health Reports, 116*(5), 404-416. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1497358/pdf/12042604.pdf

Wu, T. Y., West, B., Chen, Y. W., & Hergert, C. (2006). Health beliefs and practices related to breast cancer screening in Filipino, Chinese and Asian-Indian women. *Cancer Detection and Prevention, 30*, 58-66. doi:10.1016/j.cdp.2005.06.013

Appendix A: Clear Communication Index Worksheet

Clear Communication Index Score Sheet

Before you begin

Determine your readers

- Literacy level of audience?-

Use lowest level of literacy if not known

- Message you want to convey (goal)?
- Message of the material?

Part A: Core	Answer each question with
1. Material contain one main message statement?	Yes-1, No-0
2. Main message in the first paragraph or section?	Yes-1, No-0
3. Main message stressed with font, color, shapes, lines, arrows, or headings?	Yes-1, No-0
4. Contains at least one visual that supports the main message?	Yes-1, No-0
5. Does message include call to action?	

Language

6. Message in active voice?	Yes-1, No-0
7. Material always uses words the audience uses?	Yes-1, No-0

Information Design

8. Does material use bulleted or numbered lists?	Yes-1, No-0
9. Is material organized in groups with headings?	Yes-1, No-0
10. Is important information summarized in the first section?	Yes-1, No-0

State of Science

11. Material explain what authoritative sources, such as subject matter experts and agency spokesperson, know and don't know about the subject?	Yes-1, No-0

Part B Behavioral Recommendation

12. Does the material include one or more behavioral recommendations for the primary audience? (total score = 3)	Yes-1, No-0

If no stop and don't score part B

13.Does the material explain why the behavioral recommendation is important to the audience?	Yes-1, No-0
14.Does the behavioral recommendation include specific directions about how to perform the behavior?	Yes-1, No-0

If yes score 12-14.

If No - skip to Part C

Part C; Numbers

Answer this question to determine if items 15-17 apply to the material.

Does the material include one or more numbers related to the topic? (total score = 3).

If Yes - score items 15-17

If No - skip to Part D.

15.Does the material always present numbers the primary audience uses?	Yes-1, No-0
16.Does the material always explain what the numbers mean?	Yes-1, No-0
17.Does the audience have to conduct mathematical calculations?	Yes -1, No -0

Part D: Risk

Answer this question to determine if items 18-20 apply to the material

18. Does the material present information, including numbers, about risk?	
If yes - score items 18-20 Items 19 and 20 have “not applicable” (NA) options If no - skip to Calculate the Score.	
19. Does the material explain the nature of the risk?	Yes-1, No-0
20. Does the material address both the risks and benefits of the recommended behaviors?	Yes- 1, No-0, NA
If the material uses numeric probability to describe risk, is the probability also explained with words or a visual? (total score = 3).	Yes- 1, No-0, NA

Part D score	How to interpret score.
Calculate the score for the material	>90 and above-you have addressed most items that make materials easy to understand and use.
Step 1: The total points that the material earned (numerator)	89 or below=revise and improve the material.
Step 2: The total possible points material could have earned (denominator)=11	
Step 3 Divide the numerator over the denominator then multiple by 100 = CCI score	

CCI-Clear Communication Index. Adapted from Center for Disease Control and Prevention (CDC, 2015). Retrieved from https://www.cdc.gov/ccindex/pdf/full-index-score-sheet.pdf

Appendix B: Search Strategies

Inclusion Criteria	Exclusion Criteria	Electronic Databases	Health Organizations	Books
Year 2000-2017	Languages other than English	CINAHL	CDC	American Association of Colleges of Nursing. (2006). AACN essentials of doctoral education for advanced nursing practice. Friis, R. H., & Sellers, T. A. (2014). Kindig, D. A., Panzer, A. M., & Nielsen-Bohlman, L. (Eds.). (2004). Press.Health Literacy: A Prescription to End Confusion.
	Not peer reviewed, not free	Thoreau	NNLM	Nash, D. B., Fabius, R. J., Skoufalos, A., & Clarke, J. (2015).
Free, peer reviewed		PubMed	HHS	
Written in English		Google Scholar	San Antonio Economic Development Foundation	

	Plain Language.gov	U.S. Department of Health and Human Services. (2000). Healthy People 2010 (2nd ed.).
		U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (HHS, 2010). National action plan to improve health literacy.
	San Antonio Public Library	
	Institute of Medicine	

CINAHL- Cumulative Index to Nursing and Allied Health Literature, CDC-Center for Disease Libraries of Medicine.Control and Prevention, HHS-US Department of Human Services, NNLM-National Network of Medicine.

Appendix C: Clear Communication Index Worksheet Assessing Medication Instruction Readability Score

Clear Communication Index Score Sheet

Before you begin

Determine your readers

Literacy level of audience?- lowest

Message you want to convey (goal)? How to take your medicines

Message of the material? - How to take your medicines

Part A: Core

Material contain one main message statement? Yes-1

Main message in the first paragraph or section? Yes-1

Main message stressed with font, color, shapes, lines, arrows, or headings? Yes-1

Contains at least one visual that supports the main message? No-0

Does message include call to action? Yes-1

Language

Message in active voice? Yes-1

Material always uses words the audience uses? Yes-1

Information Design

Does material use bulleted or numbered lists? Yes -1

Is material organized in groups with headings? Yes-1

Is important information summarized in the first section? Yes-1

State of Science

Material explain what authoritative sources, such as subject matter experts and agency spokesperson, know and don't know about the subject? Yes-1

Part B

Does the material include one or more behavioral recommendations for the primary audience? (total score = 3) Yes-1

Does the material explain why the behavioral recommendation is important to the audience? Yes-1

Does the behavioral recommendation include specific directions about how to perform the behavior? Yes-1

Total score is 3/3

Part C Numbers

Does the material always present numbers the primary audience uses? Yes-1

Does the material always explain what the numbers mean? N0-0

Does the audience have to conduct mathematical calculations?-No

Total score=1

Calculate the score for the material

Step 1: The total points that the material earned (numerator) is 13

Step 2: The total possible points material could have earned (denominator)=11

Step 3 Divide the numerator over the denominator then multiple by 100 = CCI score=118*

*above 89= material follows the plain language guidelines

CCI-Clear Communication Index. Adapted from Center for Disease Control and Prevention (CDC, 2015). Retrieved https://www.cdc.gov/ccindex/pdf/full-index-score-sheet.pdf

Appendix D: The DNP Leadership Satisfaction Questionnaire

Sample Stakeholders Feedback on DNP Leadership

1. Using the Clear Communication Index (readability tool) that follows the Plain Language Guidelines to assess readability score of patient education material is useful in the clinical setting.

[X] Highly agree

[ ] Agree

[ ] Highly disagree

[ ] Disagree

[ ] Neutral

2.A patient education material that is easy to understand is necessary to improve health access.

[X] Highly agree

[ ] Agree

[ ] Highly disagree

[ ] Disagree

[ ] Neutral

3.I intend to use patient education materials that follows the Plain Language Guidelines now and in the future.

[X] Highly agree

[ ] Agree

[ ] Highly disagree

[ ] Disagree

[ ] Neutral

4. I can easily identify patient education material that follows the Plain Language Guidelines.

   [X] Highly agree

   [ ] Agree

   [ ] Highly disagree

   [ ] Disagree

   [ ] Neutral

5. Overall, I am very satisfied with the way the DNP student performance on this project.

   [X] Highly agree

   [ ] Agree

   [ ] Highly disagree

   [ ] Disagree

   [ ] Neutral

X signed by the Chief Nurse Officer/preceptor.

Appendix E: Stakeholders' Meeting Minutes

Initial Meeting
CNO, QI director DNP student Meeting started with review of the gaps in practice. Doctor of Nursing Practice (DNP) student identified patient satisfaction related to health literacy was below the benchmark. The DNP student agreed to propose steps on how improve patient satisfaction scores related to health literacy in the next meeting. Meeting adjourned. Submitted by Vivian Dee [May 2017].

Appendix F: Training Sites for Plain Language Guidelines and CCI

Plain Language Guidelines-Https://cdc.gov/other/plainwriting.html
Clear Communication Index-https://www.cdc.gov/ccindex/index.html
Plain Language.Training-http://www.plainlanguage.gov/resources/take_training/